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dreams of the visualizing and symbolizing types of individuals. Whether good visualizers are better dreamers, or whether their dreams are merely of a different character from those of symbolizers, remains to be seen. But certainly the question is well worth investigating. So far as I know, no attempt has yet been made to gather data bearing on this point.

—H. C. W.

Courtship of Grasshoppers.¹—Prof. E. B. Poulton has observed this process in two different genera of Acridiidae. In the case of *Pezotettix pedestris* the sombre brown male quietly awaits, without audible stridulation, the appearance of a female, and jumps upon her unawares. At first she tries to escape, but after a little struggle submits. Before pairing the male nibbles the female gently, and while holding her keeps moving his short legs up and down. This latter process Prof. Poulton regards as a vestige of true stridulation, and that it may still be of use in influencing the female in some way.

In the case of *Gomphocerus sibiricus* the process is much more ceremonious, the males stretching out their four palpi, stridulating, and even patting the female. Apparently the habits are influenced by temperature, for certain phases of courtship could be studied most satisfactorily when the insects were first aroused to activity.—F. C. K.

ANTHROPOLOGY.²

Recent Pile Structures made by Seminole Indians in East Florida.—Mr. Henry G. Bryant, Secretary of the Geographical Society of Philadelphia, informs me that he saw, in the latter part of March, 1896, several pile-built structures made by modern Seminole Indians rising above the water of a salt estuary of the New River in Dade Co., Florida. He, in company with Dr. Murray Jordan, had visited the Seminole settlement called Big City, situated on the eastern side of the Everglades, within reach of the tide-water of New River, and above the site of old Fort Lauderdale, a region now made accessible by railroad from Lake Worth to Miami.

Ascending the river in a small steamboat for some eight or ten miles above Fort Lauderdale, Mr. Bryant, with a local guide, had proceeded in a flat-bottomed boat over a submerged meadow-like country to Big City, which he found to consist of six or eight rectangular huts

¹ Trans. Ent. Soc. Lond., 1896. J. R. M. S., p. 516.

² This department is edited by H. C. Mercer, University of Pennsylvania.

with the typical palm-thatched roof of the country. Though these habitations were built on higher ground which overlooked a lake-like expanse of water, two or three platform structures were built directly over the water, at a distance of fifteen or twenty feet from the shore. The platforms, about ten feet long by three and a half wide, without roof, rail, mat or cover, and about three feet above the surface of the water, were upheld by four poles driven into the bottom of the estuary. On inquiry Mr. Bryant who observed no objects resting upon them, learned that the platforms served the Indians as beds when, on warm summer nights, an exposed position over the water guaranteed coolness and immunity from mosquitoes.

Just around the end of the peninsula from the Ten Thousand Islands, not, therefore, above ninety miles east of the site of numerous ancient pile-built structures recently unearthed among these Keys by the University of Pennsylvania, the modern pile-set platforms of Big City seemed to furnish an interesting connecting link between the present and the past of Florida. It is hard to see how riparian savages, dwelling in any low-lying, submerged region, could avoid setting structures on piles. The town of Borneo (Lubbocks *Prehistoric Times*, p. 184), is built on piles like many Dayak villages. So is Sowik in New Guinea. The Turkish fishermen live in pile-set huts on Lake Prasias (near Salonica), just as a pile-built quarter of Tcherkask rests upon the Don, while the natives of Celebes, Solo, Aram, Mindanao, the Caroline Islands and the African gold coast continue the building of dwellings on piles at the present day.

The desire to escape mosquitoes has not been generally quoted as the motive for aboriginal "lacustrine" construction, but I myself have experienced the efficacy of a water surrounding as an immunity against mosquitoes, when house-boating along the mosquito-infested shores and islands of the Lower Rhone. Then I invariably escaped the pests that often swarmed a few yards away by anchoring for the night twenty or thirty feet out from the shore. As at Big City, the desire to escape mosquitoes seems to have inspired the pile builder, so in British Columbia, Lord says, (see Stephens' *Flint Chips*, p. 123) that Indians on the Suman prairie recently built pile dwellings on a lake in April and June to avoid mosquitoes. Venezuela came by its name (Little Venice) because of numerous aboriginal pile dwellings seen by Alonso de Ojeda in a bay called by him the Gulf of Venice in 1499, while the shores of its interior lake, Maracaibo, present native pile-dwellings inhabited to-day. Considering these facts, it may be suspected that the littoral regions of North and South America will, when thoroughly

examined, more generally reveal this method of Aboriginal construction, not as evidence of a unique type of culture, a "lost race," or a phase of human development, but as a common adaptation of the life of savage peoples, ancient and modern, to their daily environment. To what extent the hybrid Seminoles of Creek origin and post Spanish advent had intermingled with remnants of older tribes (presumably the builders of the Ten Thousand Islands villages) encountered by the first Spaniards in Florida, is unknown, but I heard no mention of pile construction as practiced by modern Seminoles at the meeting of the American Philosophical Society when the recently excavated-pile structures of the neighboring Ten Thousand Islands were discussed.

—H. C. MERCER.

The Grooved Stone Axe in South America.—The idea of the Ethnic unity of American Indians is strengthened by the fact that so common an implement of their stone age as the axe should have been hafted among them in a peculiar fashion (namely, by means of a groove), unknown, it seems, in all other parts of the world except Australia. Continuing to find these grooved stone axes throughout South America adds strength to this interesting contrast between the ancient handicraft of the new and old world, though it appears that the wide distribution of the grooved axe south of Panama has not been often noted. The Columbian Exhibition at Madrid, in 1892, showed a grooved axe (in the Pedro Baranda collection) from Campeche and a number of others from Ecuador, which could not have been distinguished from Delaware Valley specimens. One came from Nicaragua, another from Peru, and several from Bolivia, together with a curious specimen, the base of the groove of which was marked with spiral flutings. Several such axes had been collected among the Tarasco Indians in Mexico, and other typical familiar-looking specimens came from Uruguay with neighbors from the Argentine Republic. Not a few of the axe-like forms from Uruguay, Ecuador, Nicaragua and the United States of Columbia had round (pounding) or pointed (piercing) rather than blade-like (cutting) ends, and round stones, encircled by grooves of the Sioux hammer pattern, were sometimes noticed, as, for instance, in Ecuador and Uruguay. That similar mallets (though never axes) hafted on the grooves were common in prehistoric Spain, was shown by a number of ancient Iberian specimens photographed by me at the Museo Nacional, Madrid. Mortillet figures them from Italy, and the Swedish Government exhibited examples at the Columbian Exhibition above-named from the east Sibe-

rian coast of Behring Straits. Notwithstanding a few flat celt-like specimens from Peru, perforated as if for hafting, binding the handles on grooves, seemed to be the universal American characteristic, as against which omnipresent fashion in the new world, we know that the Neolithic peoples in Europe hafted all their stone axes through holes perforating the axe. Why the latter method (granted migration during or after Neolithic times) never reached America remains to be explained.—H. C. MERCER.

MICROSCOPY.

A Method of Preparing Rotifers.¹—According to N. de Zograf rotifers may be fixed and mounted in glycerin, balsam or dammar and still retain the appearance of life by a slight modification of the method attributed to M. Rousselet in Hennegrey's and Lee's "Traité de microscopie technique."

The animals in a watch glass are narcotized with a solution of cocaine, as used by Rousselet, except that the methylic alcohol is omitted. The solution is added drop by drop to the very small amount of water containing the rotifers. As soon as the movements of the animals cease without having contracted their ciliary apparatus, a considerable quantity of a 1 per cent. solution of osmic acid, diluted with 4-5 volumes of water, is turned upon them and allowed to act for about 2-4 minutes.

Meanwhile a large amount of the liquid is removed with a pipette without disturbing the animals, which have settled to the bottom of the glass. Finally, a weak solution (about 1 volume to 8-10 of distilled water) of crude pyroligneous acid is poured over the animals, and permitted to act for from 5-10 minutes, after which the animals are washed two or three times with distilled water and then the water containing them very gradually replaced by alcohol, commencing with 50 per cent. and finishing with absolute alcohol.

Thus prepared the animals are found to have contracted neither their abdominal appendages, their feet, their band of cilia, nor their tentacles, and can be mounted equally well in glycerin, balsam or dammar. The protoplasm as a result of the action of the osmic acid has a faint gray or brownish tint; and structural details are plainly visible.

The Scirtopods (*Pedalion mirum*) and the Rhizotes (*Melicerta*, *Laciniularia*, *Floscularia*, *Stephanoceros*) give the most beautiful results, and

¹ Nicolas de Zograf. Sur une méthode de préparation des Rotateurs. Comp. Rend. Acad., Paris, CXXIV, 245-6.